REMARKS

Claims 1-16 are pending in the present application. No amendments are made to the claims in this Response.

The Office Action rejected claims 1-4, 6-7 and 9-16 under 35 U.S.C. §103(a) as being unpatentable over JP 10121913 (Toshiaki) in view of U.S. 4,015,436 (Seki). Alternatively, the Office Action rejected claims 1-4 and 6-16 under 35 U.S.C. §103(a) as being unpatentable over U.S. 3,889,485 (Swearingen) in view of U.S. 4,362,462 (Blotenberg).

It respectfully is submitted that the Office Action does not establish a prima facie case of obviousness and therefore, the rejections above are hereby traversed by applicants.

The following remarks are presented regarding the proposed combination of Toshiaki and Seti.

Independent claims 1 and 13 as previously amended are directed to a rotary liquefied natural gas boil-off compressor (claim 1) and a method of operating a rotary liquefied natural gas boil-off compressor (claim 13), wherein a gas passage 8 passes through a series of compression stages 12,14,16,18 in a single compressor 10, the gas passage extending through and being in heat exchange relationship with at least one cooling means 24,26,28,30,32 disposed between the compression stages, and the cooling means being a cryogenic cooling means having a valve means for controlling flow of the cryogenic coolant into the cooling means in response to an inlet temperature (or a related parameter) of the compression stage next in series downstream of the cryogenic cooling means. Claim 13 calls for, among other elements, "adjusting a flow rate of the cryogenic coolant . . ."

In contrast, Toshiaki discloses an indirect heat exchanger 27 disposed between compressors 22,24 so as to remove the heat of compression between same. In Toshiaki, heat exchanger 27 is chilled by passage therethrough of gas from an expansion turbine 4. However, in Toshiaki, the gas from the expansion turbine 4 is not subjected to compression, as called for in independent claims 1 and 13. Toshiaki seeks to eliminate a sea water feed facility for raising a temperature of a gasified low liquefied point gas by interposing a heat exchanger 27 for cooling compressed gas in a compressed gas flow passage utilizing cryogenic effect. Toshiaki does not, however, compress the gas from evaporator 3 in the compressors 22,24. There is also no disclosure in Toshiaki about the origin of the gas which is compressed in the compressors 22,24. Therefore, one skilled in the art would not be concerned about the exit temperature of the gas from the turbine 4 as, for example, it appears from Toshiaki Figure 5 that gas from the turbine 4 is heat exchanged (with sea water?) in a heat exchanger 27. Because it appears from the disclosure of Toshiaki that there is no teaching about the gas from the turbine 4 being compressed, there would be no reason for one skilled in the art to modify Toshiaki with valve means and "adjusting a flow rate of the cryogenic coolant . . ." as called for in claims 1 and 13, respectively, of the present application.

Seki discloses providing a liquefied gas through injection tube 6 to boil-off gas upstream of a blower 1 to which the boil-off gas is fed to a suction side P of the blower. Cooling is affected by introduction, upstream of the blower, of the liquefied gas being compressed. A valve 7 is disposed in the injection tube 6 and its position adjusted according to the temperature P at the suction side of the blower 1 (Col. 2, lns. 25-35).

Initially, it is noted that it is not clear from the Office Action why one of ordinary skill in the art would be expected to dispose the valve 7 of Seki in the disclosure of Toshiaki. As stated above, Toshiaki does not disclose compression of the vaporized gas as called for in independent claims 1 and

13 and therefore the correlation between the valving called for in Seki does not seem to be necessary or something that would be sought out by one skilled in the art for inclusion into the disclosure of Toshiaki. MPEP 2142 requires the analysis supporting a §103 rejection be made explicit. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with merely conclusory statements; instead, there must be some articulated reasoning with some rationale underpinning to support the legal conclusion of obviousness". In re Kahn, 78 USPQ 2d 1329, 1336 (Fed. Cir. 2006) (MPEP 2100-128).

It respectfully is submitted that not only would one skilled in the art not be inclined to combine the references as proposed in the Office Action, but that making the combination as proposed would still not arrive at the invention of independent claims 1 and 13. There would be no incentive for one of ordinary skill in the art to combine these references, as doing so would defeat the purpose and operation of each of the separate references. For example, Toshiaki does not disclose compression of the vaporized gas as called for in independent claims 1 and 13. The Office Action sought to alter an element of Toshiaki which the Office Action contended was disclosed in the claimed invention. Such is not the case. Describing Toshiaki to have a feature similar to an element in the claimed invention which is in fact not present in said reference would of course render Toshiaki unsatisfactory for its intended purpose.

It respectfully is submitted that the combination of Toshiaki and Seki is invalid because the Office Action has assumed, incorrectly, that Toshiaki discloses an element of the claimed invention which is not in fact disclosed in Toshiaki. Therefore, not only would one of ordinary skill in the art not seek to make the combination proposed in the Office Action, but any combination which would occur would immediately render Toshiaki inoperable and unsatisfactory for its intended purpose. See MPEP 2143.01 V, wherein if a proposed modification would render the prior art invention being modified unsatisfactory for its

intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 221 USPQ 1125 (Fed. Cir. 1984).

A statement [in an Office Action] that modifications of the prior art to meet the claimed invention would have been "well within the ordinary skill of the art at the time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art, "is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references." Ex parte Levengood, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). In other words, rejections on obviousness cannot be sustained by mere conclusory statements. (MPEP 2143.01 IV). It respectfully is submitted that such is the case herein because the combination purported in the Office Action would cause the Toshiaki reference cited to fail to operate in its intended manner. As explained above, modification of Toshiaki in the Office Action was contingent upon crediting a feature of Toshiaki to have a certain characteristic which Toshiaki does not disclose or have.

Therefore, it respectfully is submitted that independent claims 1 and 13 as presented herein are patentably distinct from the references cited, as are the claims which depend therefrom. If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. In re Fine, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, the §103(a) rejection of the claims in view of the combination of Toshiaki and Seki is respectfully requested to be withdrawn.

The following remarks are provided regarding the proposed combination of Swearingen and Blotenberg.

The subject matter of independent claims 1 and 13 is directed to, among other elements, a compressor having at least two compression stages in a series. Accordingly, the compressor claimed is a single machine with a single

drive and at least two compression stages. In contrast, the compressors 12 and 35, for example, of Swearingen are with different machines having different drives. See in particular Figure 3 of Swearingen and further where Swearingen discloses individual compressors such as for example compressor 12 (Col. 6, lns. 52-53; col. 7, lns. 30-31); compressor 19 (Col. 7, lns. 42-43; col. 8, lns. 5, 11); compressor 20 (Col. 7, lns. 43-44, col. 8, ln. 11); and compressor 35 (Col. 8, lns. 62-63). That is not what is being claimed. The present invention calls for a single compressor 10 having a plurality of compression stages, such as at least two of compression stages 12,14,16,18. Therefore, it respectfully is submitted that the combination of Swearingen and Blotanberg results in a disclosure outside the scope of the present claims. The fact that applicants do not specify in the present claims that there is an inner connection of the stages and the presence of a common drive shaft is immaterial. Such a lack of specificity is permitted under U.S. Rules of Practice, and inherently does not automatically make Swearingen's individual, separate compressors into a single compressor having a plurality of compression stages, as called for in the present claims.

In addition, it appears from the Office Action that same equates the compressor 35 in Figure 3 of Swearingen as a first compression stage, while the compressor 12 of Figure 3 is a second compression stage. The Office Action appears to contend that a heat exchanger 18 of Swearingen is equated with the cryogenic cooling means of the present claims. However, in contrast to what is being claimed, the gas disclosed in Swearingen is flowing between these two individual compressors with the result being that it is warmed in the heat exchanger 18. In particular and referring to Swearingen, a right hand side of the heat exchanger 18 is approximately at a temperature close to the condensation temperature of LNG. This is evident from the description at column 7, lines 49-53, wherein it is disclosed that the stream 18c leaves the heat exchanger 18 through line 22 at about -230°F. It can be seen from the Swearingen drawings that the stream 18c leaves a right hand side of the heat exchanger 18. Therefore the temperature at the right hand

side of the heat exchanger 18 is approximately -230°F. Referring to column 6, lines 37-38 of Swearingen, a point 10 in the system is at ambient temperature. Figures 1 and 3 of Swearingen disclose that the point 10 is at the outlet on the left hand side of the heat exchanger 18. Therefore, it appears that the temperature of the left hand side of the heat exchanger is at approximately ambient temperature. Thus, gas passing from the Swearingen compressor 35 to the compressor 12 is raised in temperature in the heat exchanger 18 from approximately -230°F to approximately ambient temperature. That is not what is being claimed. Therefore, Swearingen teaches that the heat exchanger 18 is not a means for cooling the stream, but rather warms the stream.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 220 USPQ 303 (Fed. Cir. 1983) (MPEP 2141.02 VI). It respectfully is submitted that it is incorrect to equate the heat exchanger 18 with the cryogenic cooling means disposed between the compression stages of independent claims 1 and 13. That being the case, regardless of whether or not Bloatenberg discloses a valve means (claim 1) or adjusting a flow rate (claim 13), such is irrelevant because any combination of Swearingen and Bloatenberg would still not arrive at the subject matter of independent claims 1 and 13, and the claims which depend therefrom.

Moreover, contending that a Swearingen compression stage is the same as the compression stage of the present invention would alter Swearingen to be completely opposite to that which Swearingen discloses for its manner or operation. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 221 USPQ 1125 (Fed. Cir. 1984). Further, if the proposed modification or combination of the prior art would change the principal of the operation of the

prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 123 USPQ 349 (CCPA 1959) (MPEP 2143.01 VI).

Therefore, it respectfully is submitted that independent claims 1 and 13 are patentably distinct from the combination of Swearingen and Blotenberg, as are the claims which depend therefrom. Accordingly, the §103(a) rejection of independent claims 1 and 13 in view of the combination of Swearingen and Blotanberg should be withdrawn.

Claims 2-12 and 14-16 should also be considered non-obvious in view of the references cited, whether taken alone or in the combination proposed, in view of their dependence upon independent claims 1 and 13. If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. (MPEP §2143.03, In re Fine, 5 USPQ2d 1596 (Fed. Cir. 1988)).

Applicants have addressed the instant rejections with respect to the independent claims in particular, and have distinguished the applied references discussed above. It is therefore deemed unnecessary to address specific allegations of the Office Action regarding the dependant claims. Applicants therefore traverse these allegations with respect to the dependent claims, and do not concur with the same either explicitly or implicitly by not refuting each individually.

All issues raised in the Office Action are believed to have been addressed. In view of the foregoing remarks, favorable action on the merits, including allowance of all claims pending, respectfully is requested.

Respectfully submitted,

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